

Work Order ID 122846***122846***

Page 1

Item ID: D212-664-201TRN

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Turning Detail

Start Date: 7/29/14 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/15/14 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start ***NR1***

QC:

Date:

SPC (Y/N):

Date:

Stop ***NR2***Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

Draw Nbr

Revision Nbr

D212-664-241

Rev. *AD*

100

0.00

100

MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA114

2-Turn first side as per Folio FA114

3-Blend transition lines only, **do not sand whole tube**:

FOLIO REV: *AD*DWG REV: *D*

*Use mill bastard file, brush file repeatedly with file card.

*Do not use sandpaper coarser than 320 grit.

110

QC1- Inspect dimensions to dimension sheet

0.00

110

QC

Memo

0.00

Quality Control

mm 2
*14/08/04**mm 2*
14/08/04

Work Order ID 122846***122846***

Page 2

July-29-14 2:03:34 PM

Item ID: D212-664-201TRN Accept ***N9000040100*** Setup Start ***NS1***
Revision ID: Stop ***NS2***
Item Name: Crosstube Turning Detail
Start Date: 7/29/14 Start Qty: 1.00 ***1*** Cust Item ID:
Required Date: 8/15/14 Req'd Qty: 1.00 ***1*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120	MORI SEIKI CNC LATHE LARGE	0.00							
120									
Mori Seiki	Memo	0.00							
Mori Seiki CNC Lathe Large	1-Turn second side as per Folio FA114								
	2-Blend transition lines only, **do not sand whole tube**: *Use mill bastard file, brush file repeatedly with file card. *Do not use sandpaper coarser than 320 grit. FOLIO REV: <u>AD</u> DWG REV: <u>D</u> 3-Remove sand and plugs								
	4- scribe batch # and part # as per dwg								
130	QC1- Inspect dimensions to dimension sheet	0.00							
130									
QC	Memo	0.00							
Quality Control									

mmk
14/08/05

mmk
14/08/05

Work Order ID 122846

July-29-14 2:03:34 PM

122846

Page 3

Item ID: D212-664-201TRN

Accept

N900040100Setup Start ***NS1***

Revision ID:

Item Name: Crosstube Turning Detail

Stop ***NS2***

Start Date: 7/29/14 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/15/14 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
140	QC8- Inspect parts - second check	0.00							
140									
QC	Memo	0.00							JW 14-08-06
Quality Control									
145		0.00							
145									
Crosstubes	Memo	0.00							JW 14-08-07
Crosstubes	GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY.								
150		0.00							
150									
HandFXtube	Memo	0.00							① JW 14-8-8
Hand Finishing Crosstubes	1- PRESSURE WASH X-TUBE INSIDE AND OUT								DNC
	2- ACID ETCH X-TUBE INSIDE AND OUT. USE RED SCOTCH BRITE								

Work Order ID 122846

122846

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July-29-14 2:03:34 PM

Item ID: D212-664-201TRN Accept *N900040100* Setup Start *NS1*
 Revision ID: Stop *NS2*
 Item Name: Crosstube Turning Detail
 Start Date: 7/29/14 Start Qty: 1.00 *1* Cust Item ID:
 Required Date: 8/15/14 Req'd Qty: 1.00 *1* Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start *NR1*
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
160	QC5- Inspect part completeness to step on W/O	0.00							DAS 38 9-89
160						1			7/16/13
QC	Memo	0.00							
Quality Control									
170		0.00							
170	Packaging					BL		14-08-19	
Packaging	Memo	0.00							
Packaging	Identify and stock in kanban rack Location: LG								
180	QC21- Final Inspection - Work Order Release	0.00							
180						MLJ		14-08-20	
QC	Memo	0.00							
Quality Control									

14-8-19

Picklist Print

July-29-14 2:03:34 PM

Page 1

Work Order ID: 122846

122846

Parent Item: D212-664-201TRN

D212-664-201TRN

Parent Item Name: Crosstube Turning Detail

Start Date: 7/29/14

Required Date: 8/15/14

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A 08-03-06 new issue DD verified by:ec
IPP Rev B 08.04.02 Removed polish EC verified DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6006-129		Manufactured	No			120	Each	29.0000	1	1			

D6006-129

Crosstube Material

Location

Loc Qty

Loc Code

LG003

29

103426

10

107875

18

75644

1

1 mm.l 14/07/31

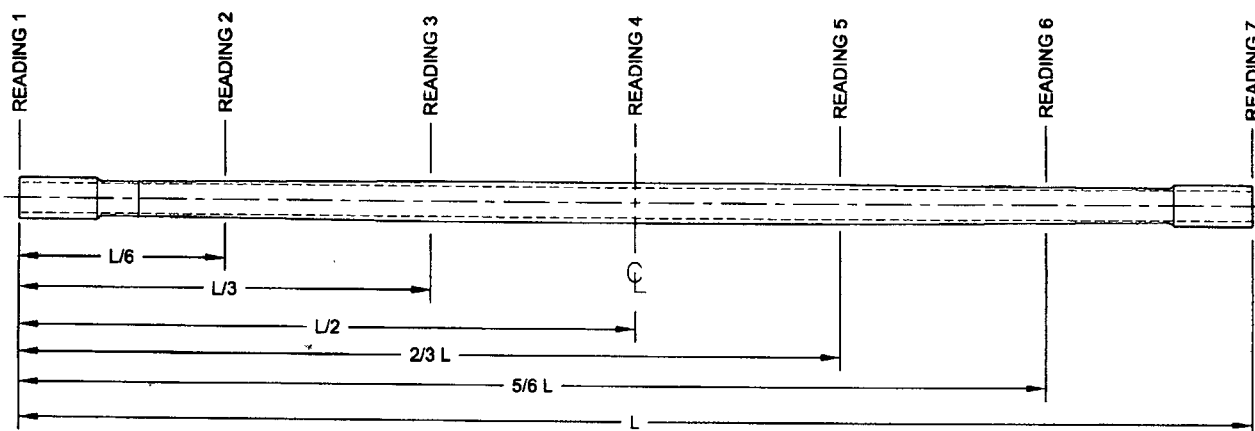
DART AEROSPACE LTD		Work Order: 172846
Description: Crosstube Assembly (205/212 High Aft)		Part Number: D212-664-241
Inspection Dwg: D212-664-241 Rev: E		Page 1 of 2

FIRST ARTICLE INSPECTION CHECKLIST

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.200	+/-0.010	.200	-		vern	CNC-08
	R0.063	+/-0.010	.063	/		RG	
	2.990	+0.005/-0.000	2.998	/		vern	CNC-08
	5.237	+/-0.030	5.240	/			
	2.600	+0.005/-0.000	2.664	/			
	2.686	+0.005/-0.000	2.690	/			
	2.770	+0.005/-0.000	2.774	/			
	2.854	+0.005/-0.000	2.858	/			
	2.938	+0.005/-0.000	2.941	/			
	3.021	+0.005/-0.000	3.023	/		mic	CNC-05
	3.133	+0.005/-0.000	3.136	/			
	3.179	+0.005/-0.000	3.183	/			
SIDE B	0.200	+/-0.010	.200	-		vern	CNC-08
	R0.063	+/-0.010	.063	/		RG	
	2.990	+0.005/-0.000	2.998	/		vern	CNC-08
	5.237	+/-0.030	5.240	/			
	2.600	+0.005/-0.000	2.664	/			
	2.686	+0.005/-0.000	2.696	/			
	2.770	+0.005/-0.000	2.775	/			
	2.854	+0.005/-0.000	2.857	/			
	2.938	+0.005/-0.000	2.946	/			
	3.021	+0.005/-0.000	3.025	/		mic	CNC-05
	3.133	+0.005/-0.000	3.136	/			
	3.179	+0.005/-0.000	3.183	/			
	124.362	+/-0.020	124.360	/		lgpc	LG-11

DART AEROSPACE LTD		Work Order:	122846
Description: Crosstube Assembly (205/212 High Aft)		Part Number:	D212-664-241
Inspection Dwg: D212-664-241 Rev: E		Page 2 of 2	

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"	.419	.402	.372	.392	-.047	0.062"
READING 2 L= 20.5	.327	.351	.304	.292	-.047	
READING 3 L= 41.5	.494	.502	.479	.478	-.024	
READING 4 L= 62	.532	.514	.521	.526	-.018	
READING 5 L= 82.5	.561	.494	.481	.489	.020	
READING 6 L= 103.5	.297	.347	.341	.296	-.051	
READING 7 L= 124.362	.417	.397	.379	.394	-.038	

Calibration Result

Actual Block Thickness: .160 .750

SITESCAN 250 Measured Thickness: .180 .750

Measured by: <i>[Signature]</i>	Audited by: <i>[Signature]</i>	Preliminary Approval:
Date: 14/08/05	Date: 14-08-06	Date:

Rev	Date	Change	Revised by	Approved
A	05.04.27	New Issue (P/O D412-664-201)	KJ/JLM	
B	06.03.09	Tolerance for 5.237 was +/-0.001	KJ/JLM	
C	07.05.08	Dwg Rev. updated	KJ/JLM	
D	10.08.03	Dimension 124.362 was 124.36	KJ	
E	12.06.04	Wall thickness form added	KJ	<i>[Signature]</i>

Item	Qty -241	Qty -241B	Part Number	Description
1	X		D212-664-241	CROSSTUBE ASSEMBLY (205/212 HIGH AFT)
2		X	D212-664-241B	CROSSTUBE ASSEMBLY (214 HIGH AFT)
3	1	1	D6006-129	CROSSTUBE
4	2		D2940-1	SUPPORT
5	4	4	D3595-063-530	RUBBER CUSHION
6		2	D5018-1	SUPPORT
7	4	4	MS21920-28	CLAMP (OR MS21920-30)
8	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6006-129
FINISHED LENGTH = 124.362±0.020
- FINISH: a) CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
b) PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
c) MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C6-2 / C6-3, HATCHED AREA)
d) PAINT OUTSIDE PER DART QSI 005 4.2
e) REMOVE MASKING AND APPLY MATTE CLEAR COAT
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- WEIGHT: D212-664-241/-241B = 44.2 lbs
- PART IS SYMMETRIC ABOUT CENTERLINE.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

MACHINING

- RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.

BENDING

- BEND PROGRESSIVELY WITH A MINIMUM OF 5 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7.2% (BASED ON O.D.) IN LOWER HALF OF R35.5 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.

ASSEMBLY

- INSTALL D2940-1 / D5018-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- INSTALL MS21920-28 CLAMPS (OR -30) WITH D3595-063-530 RUBBER CUSHIONS TO SECURE THE SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP SIDE OF CROSSTUBE.
- TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

122846

RELEASED
 2014-05-26
MP

E	D5018-1 WAS D2940-1 (-241B), PROSEAL WAS MAGNOBOND, NOTE 2: ADD INSPECTION WINDOW, NOTE 11: ALLOW 7.2% CRUSH, NOTE 15: ADD 72HR CURE AND RETORQUE FOR PROSEAL, ADD SHEET 3, CLAMPS REVERSED TO PREVENT CHAFING (ZN B7-2, B7-3), BEND HEIGHT TOL. NOW 0.25 WAS 0.13 (C1-4), INCORP DEO D-1/2	CP	14.04.01
D	REFORMAT/REVISE GENERAL NOTES/PART LIST: REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -241B (ZN D4-2, B4-2); REMOVED REF & ADD TOLERANCES (ZN D8-3 & C4-3, C6-3 & A8-3); RELOCATED FLAG #6 PER PAR 08-048 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4	RF	09.09.30
C	REMOVE -1008 ABRASION STRIP; ADD MAGNOBOND 8398, CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	CP	00.12.12
REV.	DESCRIPTION	BY	DATE

DESIGN	P	DART AEROSPACE LTD	
DRAWN	P	HAWKESBURY, ONTARIO, CANADA	
CHECKED	DW	DRAWING NO.	REV. E
MFG. APPR.	JLW	D212-664-241	SHEET 1 OF 5
APPROVED	JLW	TITLE	SCALE
DE APPR.	JLW	CROSSTUBE ASS'Y (205/212 HI AFT)	NTS
DATE	14.04.01		

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8 7 6 5 4 3 2 1

13 14 15
 D2940-1 SUPPORT
 MS21920-28 CLAMP, 2X
 D3595-063-530 RUBBER CUSHION, 2X
 2 PL

14.00

D212-664-601
 BENT TUBE

MASK AREA PRIOR TO PAINTING,
 REMOVE MASKING AFTER PAINT
 AND APPLY CLEAR COAT

2.0

SYM

**D212-664-241
 ASSEMBLY DETAIL**

E MS21920-28
 CLAMP, REF
 14 15

E 13
 APPLY PROSEAL
 BETWEEN D2940-1 AND
 CROSSTUBE

D2940-1
 SUPPORT,
 REF

D3595-063-530 RUBBER CUSHION
 UNDER CLAMP, REF

**SECTION A-A
 SCALE 4X**

RELEASED
 2014-05-26
 MP

DESIGN	Q	DART AEROSPACE LTD	
DRAWN	Q	HAWKESBURY, ONTARIO, CANADA	
CHECKED	SW	DRAWING NO.	REV. E
MFG. APPR.	MP	D212-664-241	SHEET 2 OF 5
APPROVED	MP	TITLE	SCALE
DE APPR.	H	CROSSTUBE ASS'Y (205/212 HI AFT)	NTS
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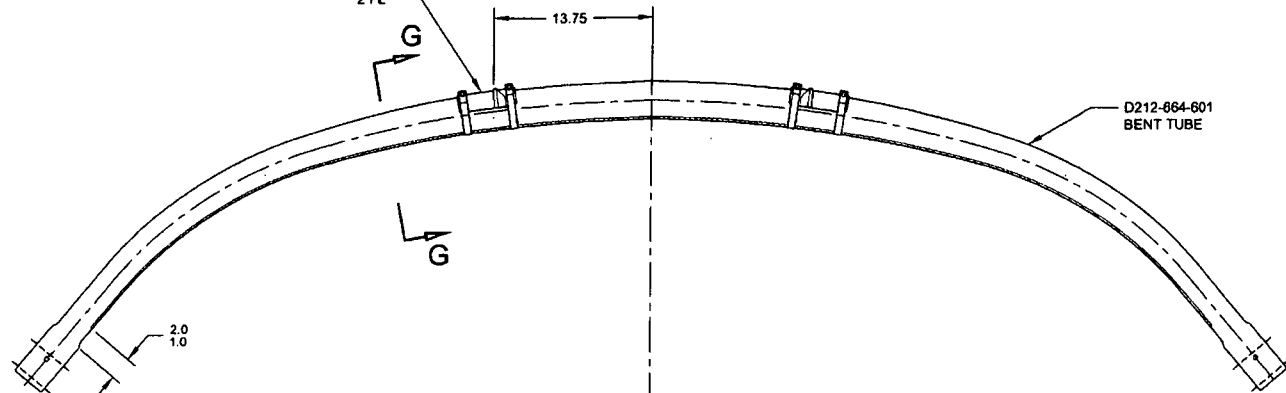
8 7 6 5 4 3 2 1

8 7 6 5 4 3 2 1

D
C
B
A

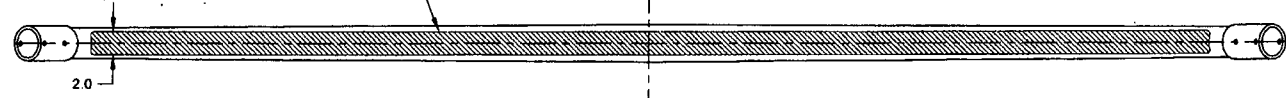
D
C
B
A

E **13** **14** **15**
 D5018-1 SUPPORT
 MS21920-28 CLAMP, 2X
 D3595-063-530 RUBBER CUSHION, 2X
 2 PL



D212-664-601
 BENT TUBE

MASK AREA PRIOR TO PAINTING.
 REMOVE MASKING AFTER PAINT
 AND APPLY CLEAR COAT



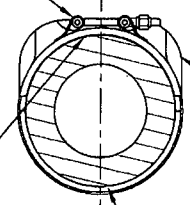
C
 SYM

D212-664-241B
ASSEMBLY DETAIL

E

E MS21920-28
 CLAMP, REF
14 **15**

E **13**
 APPLY PROSEAL
 BETWEEN D5018-1 AND
 CROSSTUBE



D5018-1
 SUPPORT, REF
E

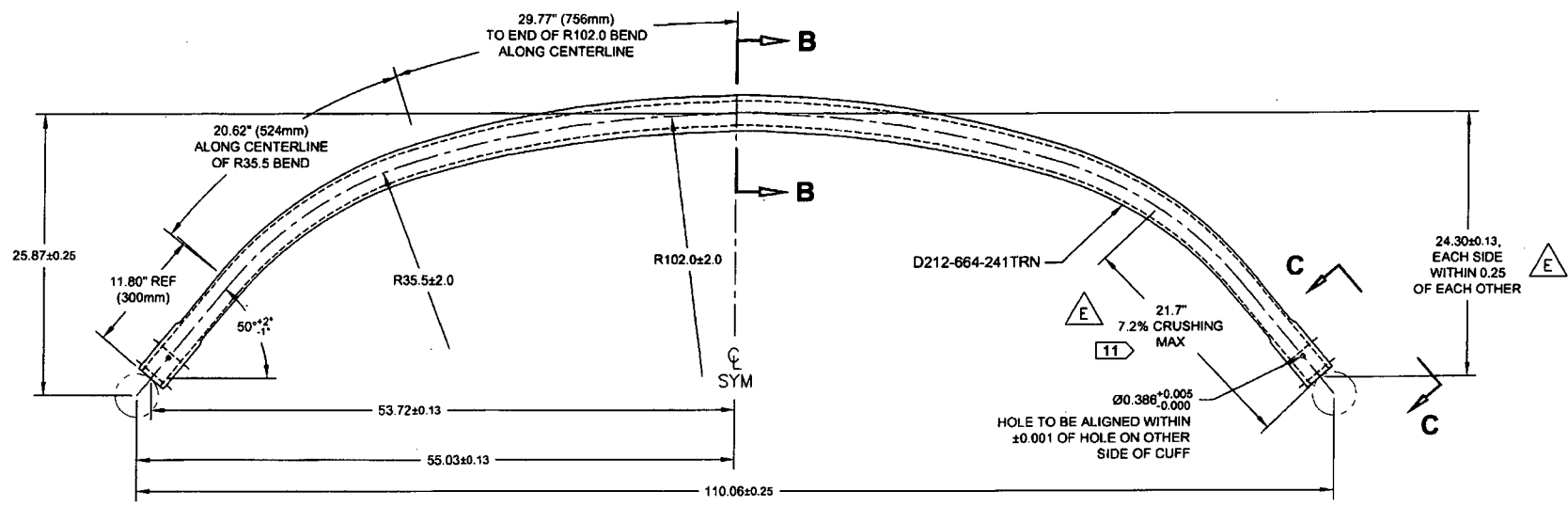
D3595-063-530 RUBBER CUSHION
 UNDER CLAMP, REF

SECTION G-G
 SCALE 4X

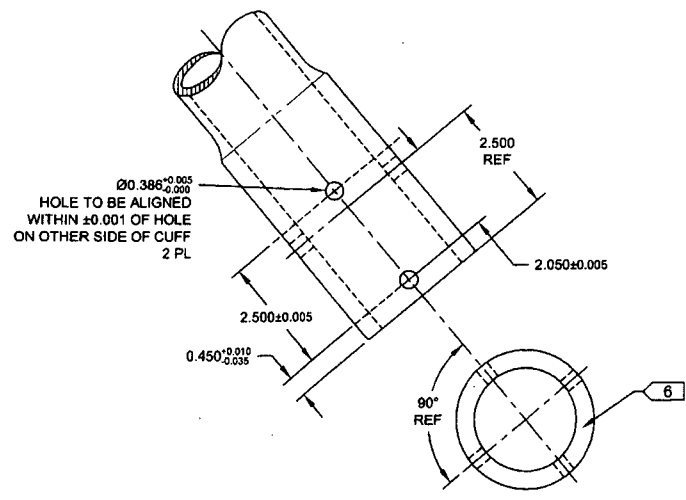
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 2014-05-26

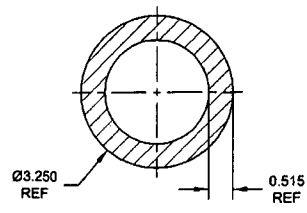
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DRAWN	9P	HAWKESBURY, ONTARIO, CANADA	
CHECKED	DW	DRAWING NO.	REV. E
MFG. APPR.	9P	D212-664-241	SHEET 3 OF 5
APPROVED	9P	TITLE	SCALE
DE APPR.	9P	CROSSTUBE ASS'Y (205/212 HI AFT)	NTS
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D212-664-601 11
BENDING AND DRILLING DETAIL



VIEW C-C: CUFF DETAIL
 SCALE 3X



SECTION B-B
 SCALE 4X

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WJD

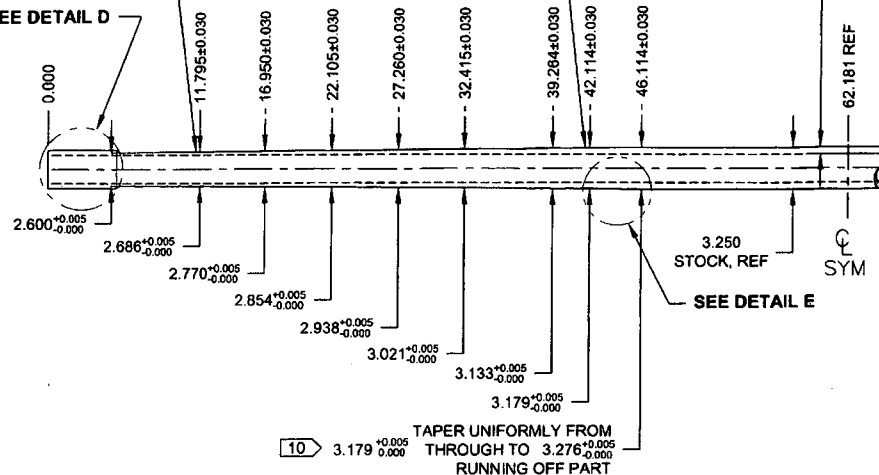
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CHECKED	<i>DW</i>	DRAWING NO.	REV. E
MFG. APPR.	<i>JP</i>	D212-664-241	SHEET 4 OF 5
APPROVED	<i>JP</i>	TITLE	SCALE
DE APPR.	<i>JP</i>	CROSSTUBE ASS'Y (205/212 HI AFT)	NTS
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R100.0 TRANSITION
BETWEEN TAPERED
SECTIONS

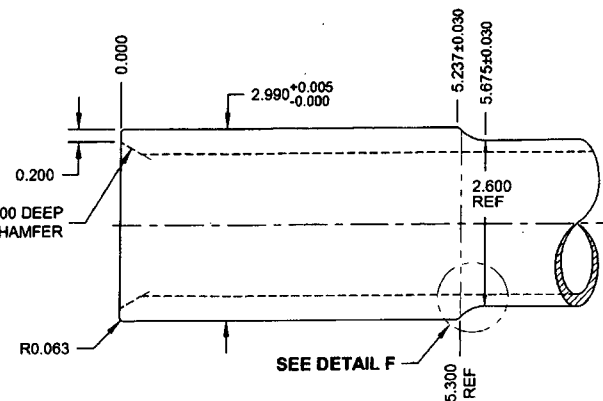
R100.0 TRANSITION
BETWEEN TAPERED
SECTIONS

0.515 WALL
STOCK, REF

SEE DETAIL D

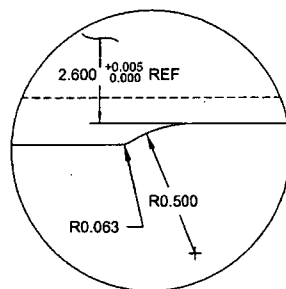


10
30° X 0.500 DEEP
CHAMFER

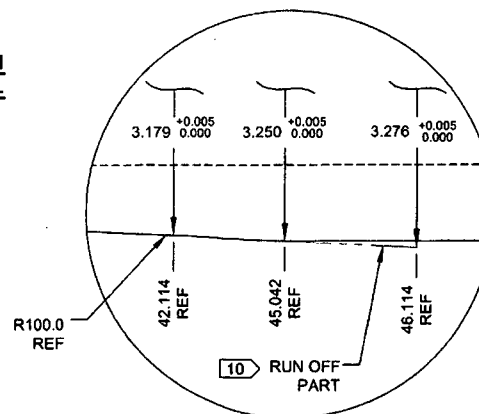


DETAIL D:
CROSSTUBE CUFF
SCALE 5X

D212-664-241TRN
TURNING DETAIL



DETAIL F:
CUFF TRANSITION
SCALE 10X



DETAIL E:
TAPER RUN-OFF
NOT TO SCALE

RELEASE
2014-05-26

DESIGN	90	DART AEROSPACE LTD	
DRAWN	90	HAWKESBURY, ONTARIO, CANADA	
CHECKED	90	DRAWING NO.	REV. E
MFG. APPR.	90	D212-664-241	SHEET 5 OF 5
APPROVED	90	TITLE	SCALE
DE APPR.	90	CROSSTUBE ASS'Y (205/212 HI AFT)	NTS
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